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Local field enhanced photoluminescence and Raman effect in Reduced Graphene Oxide Nanoclusters SANJAY KARNA, TAE-YOUL CHOI, RAKESH SHAH, MEG MAHAT, ARUP NEOGI, Univ of North Texas — The increase in local field due to metal nanoparticles can influence the radiative emission and phonon interaction in semiconductors. Graphene oxide can be reduced to modify its bandgap and tune its emission energy from the red to the ultraviolet wavelength range. Reduced graphene oxide (rGO) with Ag nanoparticles has been synthesized to study the effect of resonant surface plasmon interaction on the light emission from rGO. Comparative study of sp^2 cluster size, defect density and electrical conductivity has been performed. Preliminary result shows that the maximum decrease in the defects density in rGO structure as treated with Ag NPs and also in the same way the inter-defect distance increase as density of defects decrease and sp^2 cluster size increase rapidly. The increase in size of sp^2 cluster and decrease in defect density due to localized electric field due to Ag NPs is responsible for the increase in electrical conductivity and in PL emission. The localized electric field increases the electrical conductivity due to the decrease in sp^3 clusters compared to an (defects oxides functional in GO)? increase in sp^2 in the rGO clusters. The increase in electric field due to localized plasmon due to Ag NP resonant to the emission from rGO results in an increase in enhancement from emission from rGO. By controlling the localized surface plasmon density, the enhancement efficiency from rGO can be enhanced.

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